

about 3.7 knots. The average strength of the minimum flood was found to be about 1.3 knots. Considering the minimum flood as a negative ebb the average velocity of the maximum ebb would be about 2.2 knots. This indicates that during the period of observations the southwesterly nontidal current was flowing with a velocity of about 1.2 knots, which agrees with the velocity as determined directly from the stencil sums for components.

**BOTANY.**—*New species of Cordia and Tournefortia from northwestern South America.*<sup>1</sup> ELLSWORTH P. KILLIP, U. S. National Museum.

A revision of the Andean species of two genera of Boraginaceae, *Cordia* and *Tournefortia*, has been prepared by the writer. Publication of this is being postponed in order to include in the treatment the results of study of numerous specimens of these genera collected by the recent Killip-Smith expedition to eastern Colombia. The new species so far noted in preparing this revision, ten of *Cordia* and seven of *Tournefortia*, are here published in advance.

***Cordia crassifolia* Killip, sp. nov.**

Tree (?); branchlets terete, densely short-rufo-hirsutulous or tomentose; petioles about 1 cm. long, stout; leaves oblong-obovate, 10 to 15 cm. long, 4 to 7 cm. wide, obtuse or acutish at apex, gradually narrowed to a rounded base, entire, conspicuously nerved (lateral nerves 7 or 8 pairs), reticulate-veined, thick-coriaceous, lustrous and scabrid with short subappressed white hairs above, rufo-hirtellous and smooth beneath; inflorescence much shorter than the leaves (5 cm. long in type though evidently not fully developed), subdichotomous, the branches and calyces densely subappressed-ferruginous-hirsute, the flowers sessile, borne in clusters of 4 to 6 at ends of branches of inflorescence; calyx cylindric, 3 to 4 mm. long, indistinctly ribbed, the teeth minute; corolla lobes obtuse; anthers linear-oblong.

Type in the U. S. National Herbarium, no. 940117, collected in Colombia or Ecuador, by F. C. Lehmann (no. 6611).

The corolla is not sufficiently developed for the positive determination of the position of this species, but the small, indistinctly ribbed calyx suggests a relationship with *C. opaca* and *C. sulcata*, rather than with *C. alliodora* or *C. alba*.

***Cordia colombiana* Killip, sp. nov.**

Tree; branchlets terete, dark chestnut-brown, glabrous or very sparingly pilosulous toward ends; petioles stout, about 1 cm. long, slightly sulcate, glabrous; leaves ovate or ovate-oblong, 10 to 18 cm. long, 4 to 8 cm. wide, abruptly acuminate at apex (acumen about 2 cm. long), rounded or sub-cuneate at base, entire, conspicuously nerved and veined (principal lateral

<sup>1</sup> Published by permission of the Secretary of the Smithsonian Institution. Received June 6, 1927.

nerves 4 or 5 to a side), coriaceous or subcoriaceous, lustrous, glabrous or minutely hispidulous; inflorescence terminal, cymose, the cymes subdichotomous, up to 4 cm. wide, the branches ferruginous-hirsutulous, the peduncles short; calyx cylindric-obovoid in bud, broadest at apex, at length cylindric-turbinate, 4 to 5 mm. long, densely ferruginous-tomentose, the lobes deltoid, 1 to 1.5 mm. long; corolla white, funnel-shaped, 6 to 8 mm. long, about 3 mm. wide at throat, glabrous, the lobes orbicular, 2 mm. wide; stamens exerted; styles filiform, exerted, the divided portion equaling the united portion.

Type in the U. S. National Herbarium, no. 1,140,963, collected in thicket, between San Antonio and Río Ortega, Department El Cauca, Colombia, altitude 2100 to 2300 meters, July 2, 1922, by F. W. Pennell and E. P. Killip (no. 8024).

The foliage of this species is very similar to that of *C. bogotensis*, a plant with flowers fully three times as large, and differing in other details.

***Cordia allartii* Killip, sp. nov.**

Tree(?); branchlets terete, glabrous; leaves oblong or oblong-lanceolate, 15 to 25 cm. long, 8 to 12 cm. wide, attenuate-acuminate at apex, rounded at base, entire, conspicuously nerved and veined (principal lateral nerves 5 or 6 pairs, distant, arcuate-ascending), coriaceous, lustrous on both surfaces, glabrous, occasionally minutely hispidulous on nerves beneath; inflorescence cymose, about 4 cm. long, the branches and calyces densely ferruginous-tomentose, the flowers sessile, in clusters of 3 or 4; calyx obovoid in bud, at length cylindric-campanulate, 4 to 4.5 mm. long, 3 to 4 mm. wide at throat, the lobes ovate-deltoid, 2 mm. long, acute; corolla tube as long as calyx, the lobes orbicular-ovate, 2.5 to 3 mm. long, rounded, reflexed; stamens not exerted, the anthers oblong, 1 mm. long; ovary lance-ovoid.

Type in the U. S. National Herbarium, no. 1,230,256, collected at Colonia Tovar, Venezuela, altitude 1800 to 2000 meters, December, 1924, by A. Allart (no. 352).

Related to *C. colombiana* but with broadly campanulate calyx and much broader corolla lobes.

***Cordia macrodonta* Killip, sp. nov.**

Tree or shrub; branchlets quadrangular, ferruginous-puberulent and finely pilosulous, scabrous; petioles 0.5 to 1 cm. long; leaves broadly ovate, 6 to 11 cm. long, 4 to 6.5 cm. wide, abruptly short-acuminate at apex, narrowed to petiole, coarsely and sharply serrate-dentate except in lower third, penninerved (principal nerves 6 or 7 to a side, the secondary nerves prominent), membranous, short-strigillose-hispid above (hairs swollen at base), finely pilosulous beneath; inflorescence paniculate-cymose, the peduncles about 4 cm. long, the flowers borne singly near the ends of the branches; calyx globose-turbinate, about 2 mm. long, appressed-ferruginous-strigillose, the teeth triangular, acute, 0.5 mm. long; corolla tube cylindric, about 3.5 mm. long, the lobes orbicular; stamens attached at throat of tube, scarcely 1 mm. long, the anthers oblong, less than 0.5 mm. long; fruit ovoid-conic, 5 mm. long, 4 mm. wide, glabrous.

Type in the Field Museum of Natural History, no. 548642, collected at San Antonio, Province Huancabamba, Dept. Pura, Peru, altitude 1200-1300 meters, March, 1912, by A. Weberbauer (no. 6015).

Belonging to DeCandolle's section *Corymbosae* this species is at once distinguished from other representatives of the section by the coarsely serrate leaves.

*Cordia coriacea* Killip, sp. nov.

Tree (?); branchlets subangular, sulcate, finely canescent-puberulent; petioles 5 to 10 mm. long, canaliculate, sulcate; leaves ovate-elliptic or ovate-oblong, 10 to 15 cm. long, 5 to 7 cm. wide, attenuate-acuminate at apex, cuneate and often oblique at base, entire, penninerved (midnerve strongly sulcate, the lateral nerves 6 or 7 to a side, ascending, arcuate toward ends), inconspicuously closely reticulate-veined, coriaceous, above sublustrous, glabrescent, minutely tomentellous on nerves, beneath brownish-puberulent on nerves and veins, elsewhere softly grayish-tomentose; peduncles about 5 cm. long; inflorescence about 4 times dichotomous, cano-puberulent, the flowers sessile, in clusters of 3 or 4 at ends of the divaricate branches of the inflorescence; calyx turbinate, 4 to 4.5 mm. long, 2.5 to 3 mm. wide, slightly sulcate, cano-puberulent, the lobes lanceolate, 1 mm. long, acute, erect; corolla lobes linear-oblong, 2 mm. long, 1 mm. wide, obtuse; stamens exserted, the anthers linear, 1 mm. long; ovary depressed-globose; style 3 mm. long, exserted.

Type in the U. S. National Herbarium, no. 1,133,957, collected at Charopampa, near Mapiri, Bolivia, altitude 570 meters, November, 1907, by O. Buchtien (no. 2040).

The sulcate calyx places this species near *C. opaca* and *C. crassifolia*. The calyx, however, is turbinate rather than cylindrical, and the shape of the leaves and nature of the indument are quite different than in either of these.

*Cordia venosa* Killip, sp. nov.

Tree; branchlets terete (younger portions subangular and sulcate), densely rufo-tomentose; petioles 1 to 2 cm. long; leaves ovate or ovate-oblong, 10 to 20 cm. long, 7 to 8 cm. wide, acute or attenuate-acuminate at apex, rounded at base, entire, strongly nerved and veined (principal lateral nerves 6 to a side, arcuate-ascending), reticulate-veined, subcoriaceous, above dark green (almost black when dry), rufo-tomentose on principal nerves, finely hirsutulous on secondary nerves and veins, the indument beneath similar but much denser; inflorescence cymose, the branches dichotomous, densely rufo-tomentose, the peduncles about 6 cm. long; calyx broadly ovoid in bud, at length cylindrical-campanulate, 4 to 5 mm. long, about 3 mm. wide, rufo-tomentose, the lobes deltoid, 1.5 to 2 mm. long, acute; corolla pale greenish white, pilosulous at throat within, the lobes oblong-spatulate, 4 mm. long, 2.5 mm. wide, rounded or truncate at apex, dark-veined; stamens scarcely exserted, 2 mm. long, the anthers ovate-oblong, 2 mm. long; ovary conical, longer than style.

Type in the U. S. National Herbarium, no. 1,140,957, collected at San José, above San Antonio, Department El Cauca, Colombia, altitude 2300 to 2500 meters, July 1, 1922, by F. W. Pennell (no. 7657).

In the shape and texture of the leaves this species closely resembles *C. bogotensis* and *C. colombiana*. From both it is readily distinguished by the dense indument on the branchlets and the under surface of the leaves. The flowers are much smaller than those of *C. bogotensis*, and the shape of the calyx and corolla lobes is different from those in *C. colombiana*.

***Cordia mollissima* Killip, sp. nov.**

Shrub, thickly and softly lanate-tomentose throughout; branches terete; petiole up to 1 cm. long; leaves ovate-lanceolate, up to 7 cm. long, 3.5 cm. wide, acute or acuminate at apex, rounded or acutish at base, serrulate except at base, penninerved (primary nerves about 8 to a side), reticulate-veined (nerves and veins deeply impressed above), dark green above (mid-nerve paler), paler beneath (veins darker); inflorescence contracted supra-axillary few-flowered cymes, before anthesis nearly globose heads, the branches becoming evident after anthesis; calyx campanulate, about 2 mm. wide, lobed one-third to one-half the length, the lobes deltoid, acute; corolla cylindrical, 3 to 3.5 mm. long, shallowly lobed; stamens and style about 1.5 mm. long; anthers ovate-oblong, 0.5 mm. long, scarcely exerted.

Type in the herbarium of the Field Museum of Natural History, no. 548725, collected near Taen, Province Taen, Department Cajamarca, Peru, altitude 1200 to 1300 meters, April, 1912, by A. Weberbauer (no. 6202). Duplicate in Berlin herbarium.

PERU: Chachapoyas, *Mathews* 3134 (K).<sup>2</sup>

Related to *C. corymbosa* but differing in the dense white indument and in the closely serrulate leaves.

***Cordia krauseana* Killip, nom. nov.**

*Cordia pauciflora* Krause, Bot. Jahrb. Engler 37: 629. 1906, not *Cordia pauciflora* Rusby, 1896.

***Cordia asterothrix* Killip, sp. nov.**

Shrub 1.5 to 2 meters high, much-branched, the branches smooth or slightly scabrid, more scabrid and cano-stellate-tomentose toward tips; petioles 5 to 8 mm. long; leaves ovate or ovate-lanceolate, 2.5 to 5 cm. long, 1 to 3 cm. wide, obtuse or acutish at apex, rounded at base, abruptly cuneate to petiole, irregularly crenate-serrate, densely stellate-hispidulous above, also tomentose when young, cano-stellate-tomentose beneath; peduncles up to 6 cm. long, cano-stellate-tomentose; heads 1.5 to 2.5 cm. in diameter, densely flowered; calyx campanulate, 5 to 7 mm. long, densely cano-stellate-lanate, the teeth filiform, 2.5 to 3.5 mm. long; corolla white, the tube subequal to calyx, glabrous, the limb rotate, 7 to 10 mm. wide; anthers exerted, ovate-oblong, about 1 mm. long.

Type in the U. S. National Herbarium, no. 1,043,330, collected along Río Limón, Venezuela, May 10, 1917, by H. M. Curran and M. Haman (no. 808).

COLOMBIA: Department Huila, Quebrada de Angeles to Río Cabrera, 450-500 meters, *Rusby & Pennell* 333 (N, Y).

This differs from *C. macrocephala* in not having the corolla tube exerted beyond the calyx, and in the white, rather than rust-colored, indument of the calyx.

***Cordia rosei* Killip, sp. nov.**

Small tree or shrub, 4 to 5 meters high, much branched, the branchlets terete, dark brown, glabrous, the younger parts ferruginous-short-hirsute;

<sup>2</sup> The various herbaria at which specimens have been seen by the writer are thus indicated: F, Field Museum of Natural History; K, Royal Botanic Gardens, Kew; N, U. S. National Herbarium; Y, New York Botanical Garden.

petioles 1 to 2 cm. long, straight or slightly geniculate near base; leaves ovate-lanceolate or oblong-lanceolate, up to 9 cm. long, 5 cm. wide, acute or acuminate at apex, usually tapering at base to petiole, crenate-serrate, entire at base, penninerved (primary nerves 5 to 7 to a side, furcate toward margin), reticulate-veined, above rugulose, scabrous and sparingly hispidulous, beneath lanate, densely subappressed-pilose on the nerves and veins with glistening whitish hairs; inflorescence spicate, the spikes terminal on the branches or on short branchlets, not branched, cylindrical, 3 to 6 cm. long (peduncle usually shorter than spike), up to 1.5 cm. thick, very densely flowered, ferruginous-tomentose throughout; calyx campanulate, about 3 mm. wide at throat, 5-lobed about a third its length, the lobes ovate-deltoid, acute; corolla cylindrical-campanulate, 4 to 5 mm. long, about 4 mm. wide at throat, shallowly lobed, glabrous; stamens 2 mm. long, the anthers ovate, slightly exerted; style about 2 mm. long, cleft about half its length.

Type in the U. S. National Herbarium, no. 1,021,916, collected at Hacienda de Licay, vicinity of Huigra, Province of Chimborazo, Ecuador, August 20, 1918, by J. N. Rose and G. Rose (no. 22247).

ECUADOR: Province Chimborazo, Huigra, *Rose & Rose* 23860 (N); *Hitchcock* 20387 (N). Province Tungurahua, Ambato, *Pachano* 219 (N).

Allied to the Peruvian *C. subserrata*, this proposed species differs in having very compactly flowered spikes and smaller corollas.

#### *Cordia micayensis* Killip, sp. nov.

Shrub; branchlets terete below, angular toward tip, ferruginous-hirsutulous; petioles 1 to 2 cm. long, ferruginous-hirsutulous; leaves broadly ovate or ovate-lanceolate, 10 to 13 cm. long, 5 to 7 cm. wide, acuminate at apex, cuneate at base, closely serrate, entire at base, reticulate-veined (principal nerves 7 to 9 on a side, approximate at base and apex, rather distant at middle, the veins impressed on upper surface), above hispidulous and scabrelous, hirsutulous on the nerves, beneath appressed-pubescent on the nerves, elsewhere glabrous; inflorescence spicate, the spikes terminal and lateral, the peduncles and rachises 14 to 17 cm. long, densely ferruginous-hirsutulous; calyx tubular-campanulate, 4 to 6 mm. long, 3 mm. wide, hirsutulous, the teeth ovate-lanceolate, about 2 mm. long, apiculate; corolla tubular-campanulate, 7 to 8 mm. long, 3 to 3.5 mm. wide at throat, white, glabrous without, tomentose at throat within, 5-lobed, the lobes about 1.5 mm. long, rounded; stamens included; styles 2 mm. long, included, fruit ovoid, 5 mm. long, acutish.

Type in the U. S. National Herbarium, no. 1,140,959, collected in forest at La Gallera, Micay Valley, Department El Cauca, Colombia, 1800 meters, July 1, 1922, by E. P. Killip (no. 7920).

The main characters by which this species can be distinguished from *C. cylindrostachya*, its nearest relative, are more ovate leaves, larger calyx with longer teeth, prominent corolla lobes, and much shorter style.

#### *Tournefortia chinchensis* Killip, sp. nov.

Liana (or shrub, 2 meters high?); branches terete (or the ultimate sub-angular), scurfy, ferruginous-hirsutulous; petioles 0.5 to 1 cm. long; leaves opposite, ovate-oblong to narrowly oblong, 3 to 7 cm. long, 0.8 to 3 cm. wide, acute, slightly narrowed at base, entire, penniveined (nerves impressed above, elevated and prominent beneath, the principal lateral ones 6 or 7 to a side),

subcoriaceous, glabrous or sparingly hispidulous above, glabrous beneath except for the ferruginous-hirsutulous nerves and veins; inflorescence 3 or 4-dichotomous, the ultimate branches 2 to 3 cm. long in flower, the flowers about 2 mm. apart; sepals linear, 2 to 3 mm. long, about 1 mm. wide, acute, glabrous or sparingly pilosulous without; corolla tube cylindric, 6 to 9 mm. long, 1 to 1.5 mm. in diameter, slightly enlarged near middle, ferruginous-tomentose, greenish, the lobes orbicular, minute, scarcely 1 mm. long, glabrous; white; stamens attached near throat of tube, 1 to 1.5 mm. long; style 5 mm. long, clavate; fruit depressed-subglobose, about 8 mm. in diameter, white, glabrescent.

Type in the herbarium of the Field Museum of Natural History, no. 536185, collected at Villacabamba, Río Chinchao, Department Huánuco, Peru, altitude about 2000 meters, July 17-26, 1923, by J. F. Macbride (no. 5142). Duplicate in U. S. National Herbarium. *Weberbauer* 6607, from southwest Comas, Province Jaiya, Department Junín, altitude 3300-3400 meters, is also this species; the leaves are proportionately narrower than in the type. This locality is considerably farther south than that at which the type was collected.

The differences between this species and its two nearest relatives, all characterized by minute corolla lobes, may be shown by the following key:

Flowers sessile; corolla tube appressed-hirsute; branchlets smooth. T. ANDINA.

Flowers pedicellate; corolla tube tomentose; branchlets rough.

Calyx lobes 2 mm. long or less; leaves alternate. . . . . T. OVALIFOLIA.

Calyx lobes more than 2 mm. long; leaves subopposite. T. CHINCHENSIS.

#### *Tournefortia setacea* Killip, sp. nov.

Liana; stems subquadrangular, appressed-strigillose, with short white hairs, the older portions glabrate; petioles 0.5 to 2 cm. long; leaves subopposite or in three's, oblanceolate or ovate, 5 to 14 cm. long, 3 to 7.5 cm. wide, abruptly acuminate, narrowed at base, subdecurent, entire, penninerved (lateral nerves 5 to 8 to a side), membranous, above dark green, appressed-short-strigillose and minutely whitish-punctate, beneath paler, appressed-strigillose on the nerves, otherwise nearly glabrous; inflorescence terminal and lateral, 7 cm. wide or less, few-branched, short-peduncled; flowers sessile; sepals linear-setaceous, 4 to 5 mm. long, 0.5 mm. wide or less, appressed-strigillose, green; corolla tube cylindric, 4 to 5 mm. long, about 1 mm. in diameter, appressed-strigillose and white-punctate without, the lobes ovate-orbicular, about 1.5 mm. long, minutely mucronulate, cream-colored; stamens attached near base of corolla tube, the anthers narrowly linear, about 2.5 mm. long; fruit conical, 3 to 4 mm. long, appressed-strigillose, white.

Type in the Field Museum of Natural History, no. 536620, collected at La Merced, Department Junín, Peru, altitude about 600 meters, August 10-14, 1923, by J. F. Macbride (no. 5579; duplicate in U. S. National Herbarium).

PERU: Department Huánuco, Cushi, 1800 meters, *Macbride* 4829 (N, F).

BOLIVIA: Bopi River, *Mulford Biological Exploration* 481 (N, Y).

This resembles *T. bicolor* Sw., a common plant of the American tropics. The long setaceous sepals, like those of *T. umbellata*, of Mexico, at once distinguish it.

*Tournefortia auro-argentea* Killip, sp. nov.

Shrub or small tree; branches subquadrangulate, hirsutulous-tomentose, at length glabrate; petioles 2 to 3 cm. long; leaves opposite, ovate, 8 to 17 cm. long, 5 to 8 cm. wide, acute or acuminate at apex, tapering at base, entire or subundulate at margin, conspicuously nerved (nerves ascending, subopposite, 7 or 8 pairs), subcoriaceous, rugulose, above sparsely hispidulous, tomentellous on midnerve, beneath minutely hirsutulous-tomentellous on nerves and veins; inflorescence 2 or 3-dichotomously branched, the branches hirsutulous-tomentose, the flowering portions up to 7 cm. long; sepals lanceolate, 4 to 5 mm. long, 1.5 mm. wide, acuminate, hispidulous with silvery-white hairs; corolla white (?), the tube 6 to 7 mm. long, golden-brown-hirsute, the lobes ovate, 2 mm. wide, mucronate; fruit globose, 6 to 7 mm. in diameter.

Type in the U. S. National Herbarium, no. 703566, collected on the road from Torondoy to Mucuchías, Cordillera de Mérida, State of Mérida, Venezuela, altitude 3000 meters, March 27, 1915, by Alfredo Jahn (no. 396).

*Tournefortia vestita* Killip, sp. nov.

Shrub, about 1.5 meters high; branchlets sulcate, stout, 5 to 7 mm. thick even toward end, densely hirsute with subreflexed brown hairs up to 4 mm. long; petioles stout, up to 2.5 cm. long, with indument like that of stem; leaves ovate-oblong or ovate-lanceolate, 15 to 25 cm. long, 5 to 14 cm. wide, acute to abruptly short-acuminate, acute and subdecurent at base, entire or minutely serrulate, penninerved (lateral nerves 9 to 11 to a side), densely appressed-hirsute above with hyaline hairs, densely hirsute or hirsute-tomentose beneath with matted hyaline hairs; inflorescence terminal and lateral, the peduncles 5 to 7 cm. long, stout, hirsute, the branches 2 or 3 times dichotomous, the flowering portions up to 12 cm. long; flowers sessile; calyx lobed nearly to base, the lobes linear-attenuate, 5 to 7 mm. long, hirsute; corolla greenish white, the tube cylindric, 8 to 10 mm. long, 1.5 to 2 mm. wide, hirsute with subappressed reflexed hairs, the lobes orbicular, about 2 mm. wide, rounded at apex; fruit globose-ovoid, 5 to 6 mm. in diameter, glabrous.

Type in the U. S. National Herbarium, no. 32812, collected in clay and mud soil, Coroico, Department La Paz, Bolivia, September, 1894, by M. Bang (no. 2470). A duplicate is in the herbarium of the New York Botanical Garden.

BOLIVIA: Department La Paz, Mapiri, 1800 meters, *Rusby* 1922 (Y).

The differences between *T. vestita* and *T. obscura*, another species with hispid-hirsute branches and narrow calyx lobes are: *T. vestita*, corolla tube 1.5 mm. wide or more, inflorescence two or three times dichotomous, with equal branches, leaves more than 15 cm. long, the pubescence hyaline above, densely matted beneath; *T. obscura*, corolla tube less than 1.5 mm. wide, inflorescences a repeatedly dichotomous cyme, the branches very unequal, leaves usually much less than 15 cm. long, the pubescence of slender straight hairs.

*Tournefortia obovata* Killip, sp. nov.

Small tree; branches quadrangulate, hirsute, at length glabrous; petioles 1.5 to 2 cm. long, ferruginous-hirsute-tomentose; leaves obovate, 9 to 16 cm. long, 4 to 7 cm. wide, rounded or acutish at apex, tapering gradually at base, (nerves subopposite, 12 to 15 pairs, divaricate), above bullate, hispid, beneath

ferruginous hirsute-tomentose; inflorescence 3 to 4-dichotomous-branched, the branches hirsute, the flowering portions up to 5 cm. long; calyx-lobes ovate-lanceolate, 1.5 to 2 mm. long, hirsute; corolla "greenish," the tube 3 mm. long, 2 mm. wide, cano-hirsute, the lobes orbicular, obtuse; fruit globose, glabrous.

Type in the U. S. National Herbarium, no. 530946, collected at Cali, Department El Valle, Colombia, altitude 1000 to 1200 meters, December, 1905, by H. Pittier (no. 755).

From *T. fuliginosa*, to which it is related, this species is distinguished by obovate, less acute leaves, shorter and more slender spikes, smaller calyx and shorter corolla-tube.

***Tournefortia buchtienii* Killip, sp. nov.**

Shrub, about 4 meters high; branches subterete, ferruginous-tomentose, rough; petioles up to 2 cm. long; leaves opposite, oblong or oblong-elliptic, 7 to 14 cm. long, 3 to 5 cm. wide, acuminate, rounded or acutish at base, entire, penninerved (nerves slightly impressed above and elevated beneath, the primary ones about 10 to a side, the transverse secondary nerves rather conspicuous, nearly parallel), reticulate-veined, membranous, above dark green, appressed-strigillose except along nerves, beneath ferruginous-hirsutulous, especially along nerves; peduncles 6 to 7 cm. long, ferruginous-tomentose, subternately-branched, the branchlets 2 or 3 times dichotomous, the flowers borne on the ultimate branches at nearly uniform intervals of 2.5 mm.; sepals linear, 2 to 3 mm. long, acute, ferruginous-hirsutulous; corolla tube narrowly cylindrical, 7 to 10 mm. long, 1.5 to 2 mm. wide, dilated just below throat, ferruginous-tomentose without, the lobes orbicular, minute, 0.5 to 1 mm. wide; stamens attached near throat of tube, linear, 2 mm. long; style thick, about 7 mm. long; fruit ovoid-conical, about 7 to 8 mm. long, 5 to 8 mm. in diameter, glabrescent, white.

Type in the U. S. National Herbarium, no. 1,133,948, collected at Unduavi, South Yungas, Bolivia, altitude 3200 meters, February 12, 1907, by O. Buchtien (no. 2949). A duplicate of this is in the herbarium of the New York Botanical Garden.

BOLIVIA: Unduavi, *Rusby* 1923 (Y).

***Tournefortia rollotii* Killip, sp. nov.**

Low shrub; branches subquadrangulate, stout, the older glabrescent, the younger densely grayish-hirsute; petioles 2 to 4 cm. long, canaliculate above, hirsute; leaves broadly ovate, 8 to 15 cm. long, 5 to 10 cm. wide, acute at apex, rounded at base, abruptly tapering to petiole, slightly undulate at margin, conspicuously nerved (nerves ascending, subopposite, about 8 pairs), reticulate-veined, above pilosulous, beneath densely tomentose with fine hairs; cymes 3-dichotomous, the peduncles and branches ascending, densely hirsute; calyx lobes narrowly lanceolate, 3 to 4 mm. long, hirsute; corolla white, the tube 5 mm. long, hirsute-tomentose, the lobes ovate or ovate-lanceolate, 3 to 3.5 mm. long, 1 mm. broad at base, long-cuspidate, the cusp 2 to 2.5 mm. long; fruit ovoid-globose, 7 to 8 mm. long, 5 to 6 mm. in diameter.

Type in the U. S. National Herbarium, no. 1,059,749, collected on the Páramo de Guasca, Department Cundinamarca, Colombia, by M. Rollot (Ariste-Joseph no. A492).

COLOMBIA: Department Cundinamarca, Zipaquirá, *Pennell* 2565 (Y).



The unlobed fruit of *T. rollotii* and its erect habit indicate a relationship with the species placed by DeCandolle in the first section of *Pittonia*, rather than with the more or less scandent plants, with lobed fruits, of the second section. The corolla lobes, relatively broad but terminating in a distinct cusp, suggest *T. peruviana* and *T. mapirensis*, of the latter section.

BOTANY.—*Some Rubiaceae collected in Mexico in 1841-43 by Frederik M. Liebmann.* PAUL C. STANDLEY, U. S. National Museum.<sup>1</sup>

The U. S. National Museum received recently for study, from the University Botanical Museum of Copenhagen, through the kindness of Dr. Carl Christensen, a large series of plants of the family Rubiaceae, collected in southern Mexico in 1841-43 by Frederik Michael Liebmann. The material included most of the plants of this group obtained by Liebmann, the greater part of which had never been identified. Many of them had been submitted to Hooker, and some of the duplicates retained at Kew were listed by Hemsley in the Botany of the Biologia Centrali-Americana. Although many of the specimens which passed through Hooker's hands were named specifically, others were identified only to the genus. Some of the latter were studied also by Oersted, in connection with his work upon Central American Rubiaceae, and a few were indicated by him as new, but he never published descriptions of them.

Determination of this collection has given interesting results. Liebmann was an exceptionally efficient collector, with a keen eye for distinguishing species, and he found a number of well-marked Mexican Rubiaceae which have eluded later collectors. His whole series of plants was one of the largest ever obtained in Mexico, consisting of 90,000 specimens. He was not content with one specimen of each plant that he recognized, but repeated his collections. Too many of his successors have been satisfied to make a single collection of each species that they were able to distinguish in the field, and as a consequence they have overlooked the critical species which require a nice discrimination for their recognition. Doubtless a part of Liebmann's success resulted from the fact that he visited regions which have not received attention from more recent collectors. It is a noteworthy fact that the earlier botanists working in Mexico were able to visit remote regions, while those of recent decades seem not to have wandered far from the principal railway lines.

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